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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/027,119	12/20/2001	Pasi Leipala	413-010747-US(PAR)	3040
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			2687	

DATE MAILED: 12/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/027,119	Applicant(s) LEIPALA, PASI	
	Examiner Un C Cho	Art Unit 2687	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 July 2004.
 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-8 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) ☐ Claim(s) _____ is/are allowed.
 6) ☒ Claim(s) 1-4, 6-8 is/are rejected.
 7) ☐ Claim(s) _____ is/are objected to.
 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 – 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cygan et al. (US 5,564,086) in view of Green Jr. (US 5,701,595) and in view of Zhou et al. (US 6,611,691).

Regarding claim 1, Cygan discloses a power amplifier (Cygan, Fig. 1, 104), means for sampling forward and reflected components of the signal, a variable matching network (Cygan, Fig. 1, 111) and a processor (Cygan, Fig. 1, 110) for controlling the matching circuit on the basis of the provided samples of the forward and reflected components (Cygan, Col. 2, lines 55 – 65 and Col. 3, lines 7 – 20).

However, Cygan does not specifically disclose means for measuring the reflected field comprises an element which separates the reflected field to a separate path and which is connected to an output of the power amplifier in transmission path of a signal to be transmitted. In an analogous art, Green Jr. discloses a circulator (Green Jr., Fig. 5, 132) that separates the reflected field to a separate path and which is connected to an output of the power amplifier in transmission path of a signal to be transmitted (Green Jr., Col. 5, lines 46 – 55).

However, Cygan in view of Green does not specifically disclose the radio apparatus functions in at least two operating bands, said control unit comprising means for controlling the matching circuit also on the basis of frequency band information of said systems. In an analogous art, Zhou discloses teaches that the wireless communication device can be adapted to be used in more than one frequency band (AMPS, PCS or GSM) (Zhou, Col. 3, lines 1 – 5) and the processor (Zhou, Fig. 1, 103) controls the matching network (Zhou, Fig. 1, 130) according to the corresponding frequency band information (Zhou, Col 3, lines 60 – 64 and Col. 5, lines 62 – 66). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the technique of Zhou to the modified system of Cygan and Green in order to provide a wireless device having an antenna, which can operate on more than one frequency band and a matching circuit controlled by a processor adapted to operate on the desired frequency band.

Regarding claim 2, Cygan in view of Green and in view of Zhou as applied to claim 1 above discloses said element separating the reflected field to a separate path is a circulator arranged to direct the reflected field to the control unit and furthermore, to prevent the reflected field from propagating to the power amplifier and a circulator (Green Jr., Fig. 5, 132) that separates the reflected field to a separate path and which is connected to an output of the power amplifier in transmission path of a signal to be transmitted (Green Jr., Col. 5, lines 46 – 55).

Regarding claim 3, Cygan in view of Green and in view of Zhou as applied to claim 1 above discloses a sampler sampling forward and reflected field of the signal and providing these samples to a processor in order to change the impedance of the matching network (Cygan, Col. 2, lines 55 – 65).

Regarding claim 8, Cygan in view of Green and in view of Zhou as applied to claim 1 above discloses a portable digital cellular telephone having an antenna (Green Jr., Fig. 5, 10), an impedance matching load (Fig. 5, 38), a power amplifier feeding the antenna (Green Jr., Fig. 5, 22) and means for attenuating the reflected field, which separates the reflected field to a separate path (Green Jr., Col 5, lines 66 through Col 6, lines 6) and sampling forward and reflected components of the amplified signal and providing these samples to a processor in order to change the impedance of the matching network (Cygan, Col. 2, lines 55 – 65).

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cygan in view of Green and in view of Zhou as applied to claim 1 above, and further in view of Sroka et al. (US 5,778,308).

Regarding claim 4, Cygan in view of Green and in view of Zhou as applied to claim 1 above does not specifically disclose a matching circuit comprising at least one part the reactance of which can be controlled electrically. In an analogous art, Sroka discloses a matching network (Sroka, Fig. 3A, 31) comprising at least one part the variable-reactance circuit (Sroka, Fig. 4, 41) of

which can be controlled electrically (Sroka, Col. 4, lines 34 – 50). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the technique of Sroka to the modified system of Cygan, Green and Zhou in order to provide an improved adaptive antenna-matching network.

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cygan in view of Green and in view of Zhou as applied to claim 1 above, and further in view of Satoh (US 5,880,635).

Regarding claim 6, Cygan in view of Green and in view of Zhou as applied to claim 1 above discloses a processor controlling the matching circuit (Cygan, Col. 2, lines 55 – 65).

However, Cygan in view of Green and in view of Zhou as applied to claim 1 above does not specifically disclose the control unit controls the matching circuit on the basis of output power information of the power amplifier. In an analogous art, Satoh discloses that impedance is being adjusted as a function of the power output level of the amplifier (Satoh, Col. 2, lines 4 – 6). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the technique of Satoh to the modified system of Cygan, Green and Zhou in order to provide a circuit, which optimizes the performance of a power amplifier in a signal transmitter.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cygan in view of Green and in view of Zhou and further in view of Sroka as applied to claim 4 above, and further in view of Chang et al. (US 5,959,516).

Regarding claim 7, Cygan in view of Green in view of Zhou and further in view of Sroka as applied to claim 4 above discloses a matching network (Sroka, Fig. 3A, 31) comprising at least one part the variable-reactance circuit (Sroka, Fig. 4, 41) of which can be controlled electrically (Sroka, Col. 4, lines 34 – 50).

However, Cygan in view of Green and further in view of Sroka does not specifically disclose that the reactance comprises at least one MEMS capacitor. In an analogous art, Chang discloses a high Q MEMS capacitor (Chang, Col. 4, lines 11 – 13). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the technique of Chang to the modified system of Cygan, Green, Zhou and Sroka in order to provide a high Q MEMS capacitor with a capacitance that is reversibly trimmable or continuously tunable with a large tuning ration and is insensitive to the signal voltage.

Response to Arguments

6. Applicant's arguments filed 7/16/2004 have been fully considered but they are not persuasive.

The applicant argued that Cygan does not disclose the use of a circulator as a directional coupler, a tuning arrangement for two operation bands, the

directional element located between the matching circuit and antenna and the information about the strength of the transmitting field is obtained from the directional coupler. Moreover, the applicant also argued that Green does not disclose matching circuit controlled by a signal obtained from the circulator and lastly the applicant argued that Zhou does not disclose the changes of the antenna impedance caused by external conducting objects are compensated in two separate bands.

The examiner disagrees to the argument presented by the applicant and the reasoning is as followed:

Cygan discloses a directional coupler. However, Cygan does not specifically disclose the use of a circulator as a directional coupler. In an analogous art, Green discloses a circulator as a directional coupler (separating the reflected field to a separate path, Green Col. 5, lines 46 – 55). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the technique of Green to the system of Cygan in order to provide a circulator section in a transceiver receives a transmit signal and an antenna signal and provides them respectively to an antenna and to an electronic switch and since the signal path of any portion of the transmit signal reflected by a mismatched antenna is terminated by the load to protect the transmitter by not allowing the reflected power back to the transmitter.

Cygan in view of Green as applied to claim 1 above discloses directional element (circulator) located between the matching circuit (impedance matching

load) and antenna, and a circulator (Green Jr., Fig. 5, 132) that separates the reflected field to a separate path and which is connected to an output of the power amplifier in transmission path of a signal to be transmitted (Green Jr., Col. 5, lines 46 – 55).

Cygan in view of Green and in view of Zhou discloses a tuning arrangement for two operation bands (wireless communication device can be adapted to be used in more than one frequency band (AMPS, PCS or GSM) (Zhou, Col. 3, lines 1 – 5) and also the processor (Zhou, Fig. 1, 103) controls the matching network (Zhou, Fig. 1, 130) according to the corresponding frequency band information (Zhou, Col 3, lines 60 – 64 and Col. 5, lines 62 – 66).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the technique of Zhou to the system of Cygan and Green in order to provide a wireless device having an antenna, which can operate on more than one frequency band and a matching circuit controlled by a processor adapted to operate on the desired frequency band.

The argument presented by applicant regarding, changes of the antenna impedance caused by external conducting objects are compensated in two separate bands, cannot be found anywhere in the claims previously presented, therefore, this argument is not being considered.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

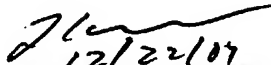
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Un C Cho whose telephone number is (703) 305-8725. The examiner can normally be reached on M ~ F 8:00AM to 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester Kincaid can be reached on (703) 306-3016. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Un C Cho
Examiner
Art Unit 2687


12/22/07
LESTER G. KINCAID
PRIMARY EXAMINER